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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Applicant: Roger Sandstrom	Examiner: Jennifer H. Gay
Serial No. 09/806,220	Group Art Unit: 3672
Filed: May 14, 2001	
Title: Thread Coupling For A Drill String For Percussive Rock Drilling	

Commissioner for Patents
Washington, D.C. 20231

REQUEST FOR RECONSIDERATION

Applicant has carefully reviewed the Official Action dated November 25, 2002 for the above identified patent application. For the reasons to be discussed below, Applicant respectfully requests reconsideration and withdrawal of the prior art rejections raised in the Official Action.

Independent Claim 1 is the only claim pending in this application. At page 2, paragraph 2 of the Official Action, Claim 1 has been rejected under 35 U.S.C. Section 103(a) as being obvious over a combination of the previously applied Jansson et

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al patent (U.S. Patent No. 4,760,887) in view of the newly applied Saunders et al patent (U.S. Patent No. 4,549,754). At page 2, paragraph 3 of the Official Action, Claim 1 has been rejected under 35 U.S.C. Section 103(a) as being obvious over a combination of Jansson et al in view of Saunders et al and the previously applied Eklof et al patent (U.S. Patent No. 4,687,368). At page 3, paragraph 4 of the Official Action, Claim 1 has been rejected under 35 U.S.C. Section 103(a) as being obvious over the previously applied Larsson patent (U.S. Patent No. 4,861,209) in view of Saunders et al. At page 4, paragraph 5 of the Official Action, Claim 1 has been rejected under 35 U.S.C. Section 103(a) as being obvious over Larsson in view of Saunders et al and Eklof et al.

The Jansson et al, the Saunders et al, and the Eklof et al patents were extensively discussed in Applicant's Amendment filed on October 15, 2002. The discussion of these three (3) references at pages 3 - 8 of the earlier filed Amendment is expressly incorporated by reference herein. As discussed in the earlier Amendment, independent Claim 1 is directed to a thread coupling for a drill string for percussive rock drilling, and the claim expressly recites that a male thread and a female thread are conical. On the contrary, both the Jansson et al and Eklof et al patents expressly disclose cylindrical threadings and do not teach or suggest conical threading as claimed by Applicant. The Larsson patent likewise does not teach or suggest a conical

thread coupling for a drill string for percussive rock drilling, as claimed by Applicant.

In the latest Official Action, the newly applied Saunders et al patent has been combined with the previously applied Jansson et al, Larsson, and Eklof et al patents to reject Applicant's independent Claim 1. The latest Official Action, in referring to Saunders et al, states that "...As seen in Figures 11 and 14, Saunders et al teaches a threaded tool joint for an oil well tool that has a tapered thread...". The Official Action concludes that it would have been obvious to taper the thread of Jansson et al or Larsson to provide a tool joint resulting in lower local pressures and reduced susceptibility to fatigue failure.

Applicant respectfully disagrees with the Examiner's conclusion. The Saunders et al disclosure is directed exclusively to oil drilling. Oil drilling is deep rotary drilling requiring many drill tubes (See, for example, column 2, lines 63 - 65, and column 3, line 57 through column 4, line 4 of the Saunders et al specification). Percussive drilling, the subject matter to which Applicant's independent Claim 1 is directed, is not efficient for oil drilling because impact energy would be lost in each connection between the many different tubes required in an oil drilling operation so that very little, if any, impact energy is provided to the drill bit when drilling at deep levels below the earth's surface.

Independent Claim 1, in addition to reciting a thread coupling for a drill string for percussive rock drilling having male and female threads which are conical, also expressly recites that the crests of the male thread have a radius of curvature which is larger than 30% of the pitch of the thread. On the contrary, the Saunders et al reference does not address the radius of the crest of the male thread, and thus does not teach or suggest this express recitation in Applicant's independent Claim 1.

The Saunders et al patent is primarily concerned with modification of the root part of the thread, which is an issue different from that disclosed and addressed in Applicant's specification and recited in Applicant's pending independent Claim 1. As noted, the Saunders et al disclosure is directed to rotary drilling, and in particular, rotary drilling for oil [See column 3, line 57 through column 4, line 4, of the Saunders et al specification referring to API (American Petroleum Institute) specifications], and thus Saunders et al addresses problems which are different in nature from problems experienced in the percussive drilling art, the subject matter addressed by Applicant.

Since rotary drilling and percussive drilling are quite different in nature, each employing different structure and different structural arrangements, there is clearly no suggestion in the prior art itself to combine the disclosure of Saunders et

al with the disclosures of Larsson, Jansson et al, or Eklof et al. As discussed in Applicant's specification, and as also discussed at pages 3 - 4 of the Amendment filed on October 15, 2002, the thread coupling for percussive drilling as disclosed and claimed by Applicant, results in an advantageous transfer of impact energy in a percussive rock drilling device. These advantages would not be realized in an oil drilling operation, such as that disclosed by Saunders et al, as a result of the loss of impact energy between adjacent connected drill tubes resulting in the transmission of little or no impact energy to the drill bit when the drill is operating at significant depths below the earth's surface, as is commonly encountered during oil drilling operations. Therefore, oil drilling devices such as that disclosed in the Saunders et al patent must necessarily employ rotary drilling equipment, and not percussive drilling equipment as disclosed and claimed by Applicant and as disclosed in the applied Jansson, Larsson et al and Eklof et al patents. Simply stated, rotary drilling devices and percussive impact drilling devices are different in structure and operation, address and encounter different problems, and therefore are not interchangeable.

Applicant respectfully submits, that as a result of the differences in nature between the rotary drilling device disclosed by the Saunders et al patent, and the percussive drilling devices disclosed by Larsson, Jansson et al, and Eklof et al, there is clearly no suggestion in the relevant art to

which Applicant's invention is directed (i.e., the percussive drilling art) to combine the references proposed in the Official Action to reject pending independent Claim 1. It is well established that references cannot be combined to reject a claim unless there is a suggestion or motivation to make the combination in the prior art itself. See, for example, Micro Chemical, Inc. v. Great Plains Chemical Co., Inc., 41 USPQ 2d 1238 (Fed. Cir. 1997). As a result of the diverse nature of the combined references, there is clearly no suggestion or motivation in the prior art itself to make the combination. Therefore, the only basis for combining these diverse references must be derived from the use of Applicant's own disclosure as a guide for selectively combining different portions of different prior art references. However, it is inappropriate to reject a claim based upon the use of Applicant's own disclosure as a guide for combining the references. See, for example, Orthopedic Equipment Co., Inc. v. United States, 217 USPQ 193 (Fed. Cir. 1983).

As noted above, and as more fully discussed in Applicant's Amendment filed on October 15, 2002, the Jansson et al patent and the Eklof et al patent, both of which are directed to percussive drilling devices, expressly disclose cylindrical threading, while the Larsson patent, also directed to percussive drilling, does not teach or suggest a conical thread coupling. There is no suggestion in the relevant prior art (i.e., percussive drilling, the subject matter to which Applicant's invention pertains) to employ a conical thread coupling in a drill string of a

percussive rock drilling device, as disclosed and claimed by Applicant. The existence of conical threading in a diverse field of art (rotary oil drilling devices) does not render Applicant's claim obvious as a result of the differences in the nature of the respective drills, particularly where the advantages resulting from Applicant's claimed devices are realized by percussive rock drilling devices and would not be realized by rotary oil drilling devices as exemplified by Saunders et al. Simply stated, Applicant submits that a person skilled in the percussive drilling art would not look to the rotary drilling art for guidance in the solution of problems in the percussive rock drilling art. In this regard, Applicant emphasizes that the background discussion at page 1 of the pending patent application is directed exclusively to problems with thread couplings in known percussive rock drilling devices.

As also noted above, the Saunders et al patent does not address the radius of curvature of the crests of the male thread relative to the pitch of the thread, as disclosed and claimed by Applicant. The Saunders et al patent is concerned with other issues, namely modification of the root part of the thread. Its failure to address any specific concerns relating to the radius of curvature relative to the pitch of the thread is further evidence that there is no suggestion in the prior art itself to combine Saunders et al with either Jansson et al, Larsson, or Eklof et al, when the disclosures of the individually combined references are each considered as a whole.

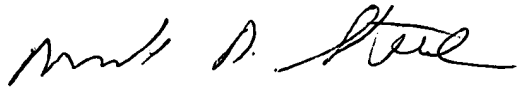
Applicant, in the arguments presented herein, has made a distinction between the art to which the invention pertains (the percussive rock drilling art), and the rotary oil drilling art. These arguments are entitled to consideration in the patentability determination. The preamble of independent Claim 1 recites "Thread coupling for a drill string for percussive rock drilling comprising...". The recitation of "drill string for percussive rock drilling", although it appears in the preamble of the claim, is nonetheless entitled to patentable consideration because 1). it is necessary for a complete understanding of the entire claim, and 2). it breathes life and meaning into the claim. More specifically, the "drill string for percussive rock drilling" is further defined in the claim as comprising a first drill string element (on which the male thread is arranged) and a second drill string element (on which the female thread is arranged). The claim further recites that the first drill string element has a first impact surface, and the second drill string element has a second impact surface, the first and second impact surfaces being arranged to abut against each other. The recitation in the body of the claim of first and second impact surfaces on first and second drill string elements arranged to impact against each other, is consistent with only a drill string for a percussive drilling device as recited in the preamble of the claim. Applicant therefore submits that the preamble of independent Claim 1, which limits the claim to percussive rock drilling devices, is entitled to consideration in the patentability determination since it gives meaning to the claim

and is not merely a statement of intended use. See, for example, Perkin-Elmer Corp. v. ComputerVision Corp., 221 USPQ 669 (Fed. Cir. 1984); Gerber Garment Technology, Inc. v. Lectra Systems, Inc., 16 USPQ 2d 1436 (Fed. Cir. 1990); and Rockwell International Corp. v. United States, 47 USPQ 2d 1027 (Fed. Cir. 1998).

For the reasons discussed herein and throughout the prosecution of this application, Applicant respectfully submits that when independent Claim 1 is considered as a whole, and when the disclosures of the individual combined references are considered in their entireties, there is clearly no suggestion in the relevant art to which Applicant's claimed invention pertains (i.e., percussive rock drilling), to combine the applied references in any manner rendering Applicant's independent Claim 1 obvious.

Applicant respectfully requests that the rejections of independent Claim 1 made in the Official Action dated November 25, 2002 be reconsidered and withdrawn, and that Claim 1 be allowed.

Respectfully submitted,



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